

REMARK

The Office Action of August 28, 2003, has been carefully considered.

Claims 1 through 17 have been rejected under 35 USC 112, second paragraph, as being indefinite in the use of the term "atomic ratio."

The term "atomic ratio" is defined in the specification at page 6, lines 14 through 16, where it is stated that "the atomic ratio is calculated by dividing the weight ratio by the atomic weight of calcium and sulfur respectively." Applicants submit that one of ordinary skill in the art would readily understand that one would therefore calculate the respective weights of calcium and sulfur in the composition as a fraction of the combined weight of calcium carbonate and sulfur to arrive at the "weight ratio." The weight fractions would then be divided by the respective atomic weights of calcium and sulfur and normalized to arrive at an atomic ratio.

In light of the definition of the term "atomic ratio" in the specification, withdrawal of this rejection is requested.

Claims 1 through 3, 4 through 5 and 10 have been rejected under 35 USC 102(b) or under 35 USC 103(a) over CA 2,044,048,

Claim 1 has now been amended to recite a liquid soil conditioning composition comprising an aqueous dispersion of calcium carbonate and sulfur, the calcium and sulfur being in an effective amounts in the dispersion to form calcium sulfate, *in situ*, in the soil structure, the atomic ratio of calcium to sulfur being in the range of 0.5:1 to 2.0:1.

The CA '048 reference is directed to a drilling fluid comprising an aqueous dispersion of sulfur in an amount of 0.03 to 0.3 kg per kg of drilling fluid. While the sulfur is in solid state at room temperature, at down hole conditions at a temperature above 113°C, the sulfur melts and a liquid

sulfur-in-water emulsion is formed. The specification discusses the addition of bentonite, carboxymethylcellulose and lignosulphonate to the composition. The only mention of calcium carbonate can be found in Claim 5 where it is stated that the drilling liquid further comprises suspended solids which can be clay, bentonite, attapulgate, calcium carbonate, barite, hematite and siderite in an amount of between 0.01 and 0.30 kg per kg of the drilling fluid.

There is, as noted, no clear instruction in the specification as to how or why one would add calcium carbonate the drilling fluid, or in what quantities and there is therefore no clear disclosure of calcium carbonate being present in a fluid in combination with sulfur in the ratios contemplated by present Claim 1. In order to arrive at the composition of Claim 1, one would need to select both calcium carbonate and a specific amount of calcium carbonate based upon a rather vague teaching.

Further, regarding the obviousness rejection, drilling fluids must be in the form of an emulsion at their operating temperature in order to be effective for the intended purpose. One of ordinary skill in the art would not look to a drilling fluids as a starting point for a soil conditioning dispersion, and there would be no expectation from the CA reference that a composition would be formed which would form calcium sulfate *in situ*.

Withdrawal of this rejection is requested.

Claims 1 through 17 have been rejected under 35 USC 103 over AU 36066/97 in view of EP 924176, Wommack et al and Ott.

It is noted that Claim 8 has been amended to recite that the composition comprises calcium carbonate in the form of rock lime and sulfur, with the atomic ratio of calcium to sulfur recited. Moreover, Claim 14 has been amended to recite

that the conditioning composition is applied in an effective amount to form calcium sulfate *in situ*, and Claims 15 through 17 have been replaced by new Claims 18 through 23 which depend directly or ultimately from Claim 14.

The AU reference is directed to an improved fertilizer containing calcium carbonate precipitates with additional ingredients. In the first paragraph at page 8, sulfur is mentioned as one of the optional ingredients to be added when sulfur nutrient levels are low. No quantities are mentioned at the top of page 8, but in Example 1, a composition is described containing 1.25 kg of calcium carbonate per hectare, and 5 kg of sulfur added to solve the sulfur deficiency problem. A composition having those quantities of sulfur and calcium carbonate has an atomic ratio of calcium to sulfur of 0.08:1, which is clearly outside of the range of the claimed invention.

The EP '176 reference discloses basic liquid soil conditioners comprising an aqueous suspension of calcium carbonate or dolomite. The reference does not mention sulfur.

The Wommack et al reference is directed to a soil conditioning agglomerate containing cement kiln dust including calcium-containing compounds. Calcium sulfate, sodium sulfate and potassium sulfate may be present in the composition as can be seen from Table 1 and in the first paragraph in column 7, it is noted that the calcium sulfate present may react with water to form gypsum. This is accompanied by a volumetric expansion of the components and such expanded components will have a reduced ability to penetrate the soil and provide the required conditioning treatment. Wommack et al does not teach the formation of calcium sulfate *in situ* by the reaction of calcium carbonate and sulfur.

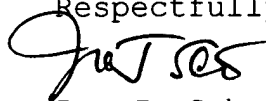
The Ott reference discloses a dispersion including elemental sulfur, an ammonium compound and a soluble zinc or magnesium compound. This dispersion lacks calcium carbonate which is an essential ingredient of the claimed soil conditioner and one of ordinary skill in the art would have no reason to combine the Ott reference with AU 36066/97 because the dispersion in the Ott reference requires elemental sulfur in combination with an ammonia compound and the soluble zinc or magnesium compounds. There is no disclosure or suggestion in Ott of combining such a composition with calcium carbonate in order to form calcium sulfate *in situ*.

All of these references relate to fertilizer compositions that improve the nutrient content of soils. In contrast, the claimed invention is a liquid soil conditioner that forms calcium sulfate *in situ* within a soil structure to reduce the sodium content of soils and improve the soil structure. There is nothing in the cited references which leads to the claimed invention, particularly method Claims 14 and 18 through 23, which are directed to a method of improving agricultural productivity of clay soils without substantially changing the pH of the soil by applying a liquid soil conditioner in the form of an aqueous dispersion of calcium carbonate and sulfur in an effective amount to form calcium sulfate *in situ* within the soil structure.

Withdrawal of this rejection is requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,



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